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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/726,450	12/02/2003	Anthony I. Chou	YOR920030451US1 (8728-657)	6760
7590 09/24/2004			EXAMINER	
Frank Chau, Esq. F. CHAU & ASSOCIATES, LLP 1900 Hempstead Turnpike East Meadow, NY 11554			LEE, CALVIN	
			ART UNIT	PAPER NUMBER
			2825	

DATE MAILED: 09/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/726,450

Applicant(s)

CHOU et al.

Examiner

Lee, Calvin

Art Unit

2825

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☐ Claim(s) \_\_\_\_ is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 10-28 is/are allowed.
- 6) ☒ Claim(s) 1-9, 29, 31, 32 and 34 is/are rejected.
- 7) ☒ Claim(s) 30 and 33 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## DETAILED ACTION

### *Claim Objection*

1. Claim 2 is objected to because of the following informality:

Claim 2, line 2, replace "10 than about 1 part per billion" with --than 1 to about 10 part billion--

### *Claim Rejections - 35 U.S.C. § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Note: This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a)

3. Claims 1-2 are rejected under 35 U.S.C. 102(b) as being anticipated by *Chiou et al.*

*Chiou et al (US 2002/0094593)* discloses a method of forming a dielectric layer of a semiconductor device, comprising the steps of:

-growing an oxynitride layer of a semiconductor device [¶ 0034] by plasma nitridation [¶ 0005]

-annealing the oxynitride layer in a mixture of N<sub>2</sub>/O<sub>2</sub> in a furnace [¶ 0030] at a temperature of about 300 °C and 900 °C for a time range between about 1 min and about 30 min [¶ 0036]

### *Claim Rejections - 35 U.S.C. § 103*

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 3-9, 29, 31-32, and 34 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Chiou et al*, as applied to claim 1, in view of *Yokoi (US 6,420,739)*.

a) *Chiou et al* is silent about capping the annealed oxynitride layer with a gate. *Yokoi et al* discloses ohmic electrodes 8 of a FET [Fig. 2E and col. 4, ln.22], wherein "the ohmic electrode was formed on an insulating film (e.g., SiN<sub>x</sub>, SiO<sub>2</sub>, SiON or the like)" [col. 2, ln.67]; and an MIM capacitor 28 formed by a dielectric layer 25 of SiN<sub>x</sub> sandwiched between upper and lower electrodes 27 and 24 of AuGe/Ni/Au [Fig. 2H and col. 6, ln.16]. *Chiou et al* also discloses "..."

and the upper layer electrode 34 of the capacitor are formed, and heated treated at 400 °C for 5 minutes in an N<sub>2</sub> atmosphere" [col. 7, ln.11].

It would have been obvious to one having ordinary skill in the art to have modified the process of *Chiou et al* by utilizing the annealed dielectric layer in a capacitor or in a field-effect transistor for the purpose of

b) In re claim 5, although *Chiou et al* does not suggest the gate/electrode metal being aluminum, *Chiou et al* discloses "it is not necessary to uses an especial metallic material of the ohmic electrode" [col. 3, ln.33].

It appears as if any electrode material including the claimed electrode aluminum would work equivalently to any other well-known electrode metal as long as the desired electrode metal material has a lower etch rate than the underlying layer (i.e., the etch stop layer).

c) In re claims 3 and 31, *Chiou et al* suggests the oxynitride layer having a thickness of 620Å, but not in a range of about 12 to about 24Å.

It would have been an obvious matter of design choice to have the claimed oxynitride thickness, since such a modification would have involved a mere change in the size of an oxynitride layer. A change in size is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955).

***Allowable Subject Matter***

6. Claims 10-28 are allowed; and claim 30 and 33 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, because none of the cited arts suggests the annealing performed in a nitrogen ambient including an oxygen concentration of about 1 to about 10 parts per billion, & cooling a semiconductor device with the annealed oxynitride layer.

Any inquiry concerning this communication from the Examiner should be directed to *Calvin Lee* at (571) 272-1896 from 7:00 to 5:00 (Monday-Thursday). If attempts to reach the examiner by telephone are unsuccessful, Art Unit 2825's Supervisory Patent Examiner *Matthew Smith* can be reached at (571) 272-1907.

Any inquiry relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0596. The fax phones are (703) 872-9318 for regular communications and (703) 872-9319 for After-Final communications.

September 14, 2004

*C. Everhart*  
CARIDAD EVERHART  
PRIMARY EXAMINER